

Isomer spectroscopy and shell structure around doubly-magic ^{132}Sn

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Within the RISING (Rare Isotope Spectroscopic Investigations at GSI) project the decay of about twenty isomeric states in neutron-rich Ag, Cd, In and Sn isotopes close to ^{132}Sn has been observed, in most cases for the first time. The nuclei of interest were produced using projectile fragmentation of ^{136}Xe and relativistic projectile fission of ^{238}U beams provided by the SIS synchrotron at GSI. The experimental results provide crucial new information concerning the shell structure around doubly-magic ^{132}Sn . In particular, the first experimental information on excited states in the N=82 r-process waiting point nucleus ^{130}Cd sheds light on the controversial discussion about the existence or not of an N=82 shell quenching. The anomalous behaviour of the 2^+ energies in the heavy Cd isotopes towards the N=82 shell closure has been studied employing beyond mean field techniques. These calculations reveal that the observed low 2^+ energy in ^{128}Cd is a consequence of the doubly magic character of this nucleus for oblate deformation favoring thereby prolate configurations rather than spherical ones.